

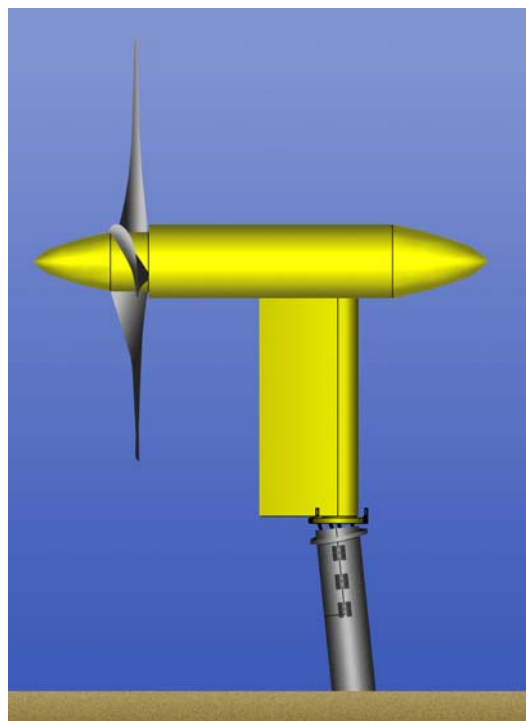
Kinetic Hydro Power System (KHPS)

an Axial Flow Turbine

Development Stage: Demonstration

Product Description

The KHPS is a 5-m diameter 3-bladed axial flow turbine rated at 35 kW, which incorporates a patented blade design having a high efficiency over a large range of speeds. The turbine rotor drives a speed increaser, which drives a grid-connected, three-phase, induction generator. The gearbox and generator are in a waterproof streamlined nacelle, which is mounted on a streamlined pylon. The pylon assembly has internal yaw bearings allowing it to pivot the turbine with the direction of the tidal current, ebb or flood. The pylon is bolted via an adjustable adapter to a pile fixed to the river bottom. Underwater cables carry the AC power to shore where they are connected to the power grid using standard distributed generation switchgear.



KHPS Turbine Using Piling-mounted River Bottom Deployment Method

<i>Product Highlights</i>		
Standard Unit Design Capacity	35.9 kW	Design Working Environment <input checked="" type="checkbox"/> Natural waterways <input checked="" type="checkbox"/> Water transmission systems <input checked="" type="checkbox"/> Effluent streams <input checked="" type="checkbox"/> Tidal estuaries <input checked="" type="checkbox"/> Near shore ocean <input type="checkbox"/> Off-shore ocean <input type="checkbox"/> Deep ocean <input checked="" type="checkbox"/> Other (dam outflows, aqueducts)
Other sizes currently available	Yes	
Characteristic Dimension	5.0 m	
Rotational Axis Orientation	Horizontal, parallel to flow	

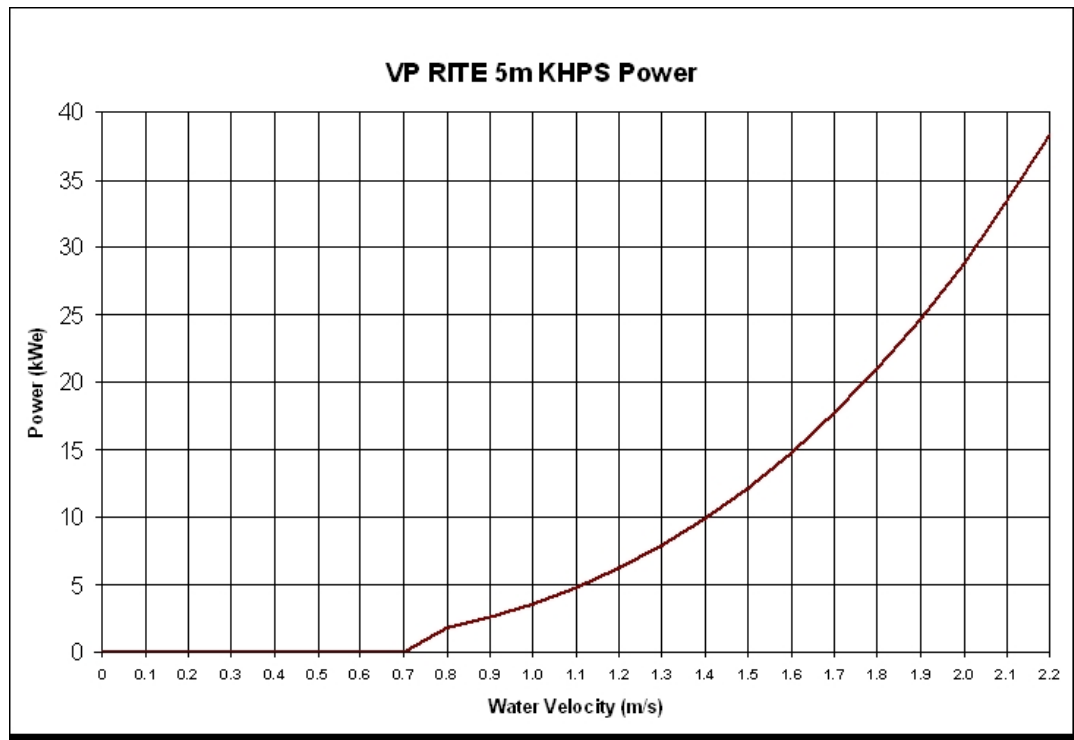
Product Specifications/Details (Standard Unit)

- Performance Specifications:**

<i>Category</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Units</i>
Velocity range	1.0	2.1	<i>m/sec</i>
Hydraulic head range	—	—	<i>m</i>
Power output range	4.2	35.9	<i>kW</i>
Waterway depth	6.0	20.0	<i>m</i>
Waterway width	6.0		<i>m</i>

- Efficiency:** Turbine: 45.0% Total System: 38.5%

- Operating Curve/Envelope:**



Design Capacity Tested:	25 kW
Test Date:	January 2003
Test Location:	East River, NY

Product Specifications/Details (Standard Unit) continued

- **Deployment Locations:** East River, New York City, NY
- **Operating History:**
 - **Blade Development & Testing:** NY University; sponsored by U.S. DOE, NYPA including use of David Taylor Model Basin: 1983–1986
 - **Initial Deployment:** Bong Canal, Mangla, Pakistan 1989
 - **Third Generation Model:** 3-Meter Diameter: Winter 2002–2003 field tested in Chesapeake Bay, MD and East River, NY
 - **Pilot 6-Unit Integrated Study System in East River, NYC:** deployment pending final regulatory approvals, Fall 2004–intended to operate up to 18 months delivering grid connected power, and providing environmental study platform
- **System Dimensions (meters):** 4.8 (L) × 5.0 (W) × 6.0 (D)
- **Unit Price (U.S. dollars):** \$90,000

Company Contact Information

Company Name	Verdant Power LLC
Mailing Address	4640 N. 13th St. Arlington, VA 22207-2102
Website URL	www.verdantpower.com
Contact's Name	Trey Taylor
Contact's Title	President and Chief Marketing Officer
Contact's Telephone	703-528-6445
Contact's Fax	703-812-8157
Contact's Email	ttaylor@verdantpower.com

Company Profile

Years in Business	3–5 years
Number of Employees	6–20 employees
Annual Equipment Sales	less than \$1,000

Affiliations/Alliances/Credentials/References/Publications

- NYSERDA, Massachusetts Technology Collaborative, DOE @ Oak Ridge & Idaho Falls, TVA, EPRI, NHA, Hydro Research Foundation
- Cooper Union School of Engineering, Columbia U, Amherst, U. of South Carolina
- Environmental Resources Trust, American Council on Renewable Energy, the Natural Step, Metropolitan Waterfront Alliance (NY)
- Authored EPRI Tech Assessment Guides for 2002, 2003, and 2004 Instream Energy Generation Technologies; Articles in Boston Globe, Environmental Science & Technology, Energy Prospects, City Limits, The New York Times, etc.